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SPECIFICATION FOR BRASS WIRES FOR COLD-HEADED AND MACHINED PARTS

(First Revision)

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2 *February* 1984

AMENDMENT NO. 1 JUNE 2004
TO
IS 2704 : 1983 SPECIFICATION FOR BRASS WIRES FOR COLD-HEADED AND MACHINED PARTS

(First Revision)

(*Page* 4, *clause* **2.0**, *line* 2) — Substitute 'IS 3288 (Part 3) 1986†' *for* 'IS 3288 (Part 1) 1981†'

(*Page* 4, *footnote marked* '†') — Substitute the following for the existing footnote

'†Glossary of terms relating to copper and copper alloys Part 3 Wrought forms '

(*Page* 4, *clause* **3.1**, *line* 2) — Substitute 'IS 1387 1993‡' *for* 'IS 1387 - 1967‡'

(*Page* 4, *footnote marked* '‡') — Substitute the following for the existing footnote

'‡General requirements for the supply of metallurgical materials (*second revision*) '

(*Page* 5, *clause* **6.1**, *line* 1) — Substitute 'IS 1608 1995*' *for* 'IS 2656 - 1964*'

(*Page* 5, *footnote marked* '*') — Substitute the following for the existing footnote

*Mechanical testing of metals — Tensile testing (*second revision*) '

(*Page* 6, *clause* **6.2.1**, *line* 2) — Substitute 'IS 1501 2002*' *for* 'IS 2866 - 1965*'

(*Page* 6, *footnote marked* '*') — Substitute the following for the existing footnote

'*Method for Vickers hardness test for metallic materials (*third revision*) '

(*Page* 6, *clause* **6.4**, *line* 2) — Substitute 'IS 1717 1985†' *for* 'IS 6253 1971†'

Amend No. 1 to IS 2704 : 1983

(*Page* 6, *footnote marked* '†') — Substitute the following for the existing footnote:

'†Method for simple torsion test for wire (*second revision*).'

(MTD 8)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR BRASS WIRES FOR COLD-HEADED AND MACHINED PARTS

(First Revision)

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Indian Standard

SPECIFICATION FOR BRASS WIRES FOR COLD-HEADED AND MACHINED PARTS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 28 October 1983, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 The brass wires are used for hardware, such as supplies for cycle spares when cold-heading and machining properties are required.

0.3 This standard was first published in 1964. In view of the experience gained during the subsequent years, it was decided to revise the standard. In this revision the following modifications have been made:

a) Metric units have been changed to SI units for all quantities and dimensions;

b) A new grade CuZn35 has been included;

c) A clause on terminology has been added;

d) Cold-headed test, reverse torsion test and wrapping test have been added;

e) Table 3 on dimensions and tolerances has been deleted and instead reference to Indian Standard has been made;

f) Requirements for chemical composition, packing, sampling and criteria for conforming have been modified; and

g) Appendix A has been deleted.

0.4 This standard contains clauses **5.1**, **8.2**, **9.0**, **10.2**, **10.3** and **11.1** where the purchaser is allowed to exercise his option and which calls for an agreement between the purchaser and the manufacturer.

0.5 In the preparation of this standard, the Sectional Committee kept in view the manufacturing and trade practices followed in the country in this field.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for two grades of brass wires for cold-heading and machining, either in cut lengths or in coils.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition as given in IS : 3288 (Part 1)-1981† shall apply.

2.1 Wire — Rolled, extruded or drawn products of solid section of uniform cross-section along its whole length and the distance between two parallel faces not exceeding 6 mm; may be supplied in straight length or in coils or spools.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall conform to IS : 1387-1967‡.

4. CHEMICAL COMPOSITION

4.1 The material shall have the chemical composition as given in Table 1.

4.2 The chemical composition shall be determined either by the method specified in IS : 3685-1966§ or any other established instrumental/chemical method. In case of dispute the procedure specified in the latest edition of IS : 3685§ for chemical analysis shall be the referee method.

5. TEMPER

5.1 The material shall be subjected to such cold working and annealing operation, as to conform to the properties mentioned in Table 2, unless otherwise agreed to between the purchaser and the supplier.

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*Rules for rounding off numerical values (*revised*).

†Glossary of terms for copper and copper alloys : Part 1 Cast form and wrought form (main types) (*second revision*).

‡General requirements for the supply of metallurgical materials (*first revision*).

§Methods of chemical analysis of brasses.

TABLE 1 CHEMICAL COMPOSITION

(*Clause* 4.1)

SL No.	CONSTITUENT	GRADE DESIGNATION	
		CuZn35 Percent	CuZn35Pb1 Percent
(1)	(2)	(3)	(4)
i)	Copper	63·0-68·0	62·0-65·0
ii)	Lead	0·02 *Max*	0·75-1·50
iii)	Iron, *Max*	0·05	0·10
iv)	Total impurities, *Max*	0·30	0·50
v)	Zinc	Remainder	Remainder

6. MECHANICAL PROPERTIES

6.1 The material when tested in accordance with IS : 2656-1964* shall have tensile properties as given in Table 2.

TABLE 2 MECHANICAL PROPERTIES

SL No.	GRADE DESIGNATION	TEMPER CONDITION	TENSILE STRENGTH		ELONGATION ON 100 mm GAUGE LENGTH	HARDNESS
			Min	*Max*	*Min*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			MPa	MPa	Percent	HV
i)	CuZn35	Quarter Hard (HA)	345	410	30	110 to 130
		Half Hard (HB)	420	510	15	131 to 160
ii)	CuZn35Pb1	Quarter Hard (HA)	325	390	30	110 to 130
		Half Hard (HB)	400	490	20	131 to 150
		Hard (HD)	500	685	15	151 to 175
		Extra Hard (HE)	695	885	5	176 to 215

NOTE — 1 MPa = 0·102 kgf/mm^2.

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*Methods for tensile testing of copper and copper alloy wires.

6.2 Hardness

6.2.1 The hardness of the material when tested as prescribed in IS : 2866-1965* shall be in accordance with the values given in Table 2.

6.3 Cold Headed Test — CuZn35 alloy shall withstand the following test.

6.3.1 A length of wire equal to its diameter shall be flattened cold in an axial direction until the diameter of the flattened piece is twice the original diameter. There shall appear no cracks on the periphery of the flattened portion.

6.4 Reverse Torsion Test — CuZn35 alloy shall withstand the following test when tested as per IS : 6253-1971†.

6.4.1 A 150 mm length of the wire shall be gripped between two jaws, one of which is free to rotate and the other is free to move longitudinally. The free end shall be turned six times through 360° in one direction and then turned same number of times in the opposite direction. *There shall not appear any defect on the surface of the material.*

6.5 Wrapping Test (Up to 6 mm Diameter) — The wire shall not break when wrapped round a wire of its own diameter, in accordance with IS : 1755-1983‡, to form a close helix of 8 turns and then subjected to unwrapping and rewrapping of 6 turns.

7. FREEDOM FROM DEFECTS

7.1 The wires shall be clean, smooth, uniform in diameter, free from segregations, cracks, twists and kinks and other internal faults.

8. TOLERANCES ON DIAMETER

8.1 The tolerances on the diameter shall be in accordance with IS : 9861-1981§.

8.2 Where tolerances other than those specified in **8.1** are required, these shall be subject to agreement between the purchaser and the supplier.

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*Method for Vickers hardness test for copper and copper alloys.

†Method for simple torsion testing of copper and copper alloy wire.

‡Method of wrapping test for metallic wire (*first revision*).

§Dimensions for wrought copper and copper alloy wires for general engineering purposes.

9. SAMPLING AND CRITERIA FOR CONFORMITY

9.0 Unless otherwise decided by mutual agreement of the purchaser and the supplier, the following sampling procedure and criteria for conformity shall hold good.

9.1 Lot — In any consignment all the coils of wire of the same size, grade and temper, manufactured under similar conditions of production shall be grouped together to constitute a lot. However, a lot shall not exceed 1 000 kg in mass. If necessary, two or more lots shall be formed on the basis of the mass of the consignment.

9.2 Each coil of wire shall be examined for freedom from defects and for tolerance on diameter. Any coil found defective shall be rejected.

9.3 For chemical composition, one test shall be conducted for each 200 kg or part thereof of wire in the lot. For this purpose necessary number of coils shall be selected at random in accordance with IS : 1817-1961*. One test shall be conducted for chemical analysis from each of the coils selected.

9.3.1 If the results of chemical analysis as obtained for each of the constituents satisfy the corresponding requirements, the lot shall be considered as conforming to the chemical requirements of the specification.

9.3.2 If a test result of chemical analysis fails to satisfy the requirements for any of the constituents, two more tests for that constituent shall be done on the same sample in order to confirm that the analysis has been done properly. If both the test results satisfy the relevant requirements the lot shall be considered as conforming to the specification, otherwise not.

9.4 The number of samples for mechanical tests (tensile test, hardness test, cold-headed test, and reverse torsion test) shall be at the rate of one per every 100 kg or part thereof, in the lot.

9.4.1 The lot shall be considered as conforming to the requirements of the mechanical tests if all the test results on different samples satisfy the corresponding requirements.

9.4.2 If the test results on any sample for mechanical tests fail to satisfy the requirements for any of the mechanical properties, two more tests shall be done on sample collected from the same coil. If both the test results satisfy the relevant requirements, the lot shall be considered as conforming to the specification, otherwise not.

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*Methods of sampling non-ferrous metals for chemical analysis.

10. PACKING

10.1 The wires shall be coiled carefully and each length of wire shall be made up into a separate coil weighing up to 50 kg.

10.2 The inner diameter of the coils, depending on size of the wire, shall be subject to agreement between the purchaser and the supplier.

10.3 In case of wires supplied in straight length, the length of each wire and mass of bundle shall be as agreed to between the purchaser and the supplier.

10.4 The coils/bundles shall be suitably packed to avoid damage during transit.

11. MARKING

11.1 Suitable tags/labels with marking made on them to indicate the designation, and temper of the material, lot number, coil number, date of manufacture, size and net mass of wire in addition to the name of the manufacturer and any other information required by the purchaser, shall be attached to each coil/bundle of the material.

11.2 The coils/bundles of wire may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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